FISHERY MANAGEMENT INVESTIGATIONS

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Steven M. Huffaker, Director

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS
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PROJECT I. SURVEYS AND INVENTORIES
Job b. Southeast Region Lowland Lakes Investigations
Job c. Southeast Region Rivers and Streams Investigations
PROJECT II. TECHNICAL GUIDANCE
PROJECT III. HABITAT MANAGEMENT

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1999 ANNUAL PERFORMANCE REPORT

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ABSTRACT

In 1999, we completed four lowland lake and reservoir surveys, evaluated winter-feeding habits of rainbow trout in Chesterfield Reservoir, and monitored bass fishing tournaments on American Falls and Glendale reservoirs. In general, the lowland lake and reservoir surveys provided information on relative species composition and condition factors for sport fish. For Blackfoot Reservoir, we found that relative species composition continues to be dominated by Utah chub *Gila atraria* and sucker *Catostomus spp*. Yellow perch *Perca flavescens*, an illegally introduced species, also continues to expand in numbers. In Condie and Twin Lakes, largemouth bass *Micropterus salmoides* and bluegill *Lepomis macrochirus* population dominate the fish communities. Relative weights for bass are 115% in Condie Reservoir and 91% in Twin lakes. In Chesterfield, Utah chub made up a larger proportion of the relative species composition compared to survey results from 1997. During the same two-year period, relative weights of rainbow trout *Oncorhynchus mykiss* declined significantly. Diet work completed in Chesterfield Reservoir showed that rainbow trout are not using Utah chub as forage.

Fishing for bass in American Falls Reservoir continues to grow in popularity. In 1999, four bass fishing tournaments were held on American Falls Reservoir. During those tournaments, catch rates ranged from 0.31 to 1.82 fish per hour. Most of the bass caught on the reservoir were smallmouth bass *M. dolomieu*. The largest bass taken by tournament anglers was a largemouth bass that weighed about 4 kg. In Glendale, the mean size of bass caught during tournament fishing has increased gradually since 1992. The increase in bass size is likely a result of the regulation change to 16-inch minimum length restrictions. Condition of bass remains high with mean relative weights values that exceed 100%.

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INTRODUCTION AND METHODS

Lowland Lake Surveys

We completed four lowland lake and reservoir surveys in 1999. When a lowland lake survey was conducted, the following standardized gear was used. One unit of effort for each of the gear types combined equals one unit of "sampling effort." The minimum standard amount of sampling effort is dependent upon the size of the body of water.

1. Gill nets – Floating and sinking monofilament nets, 46 m x 2 m, with six panels composed of 19, 25, 32, 38, 51, and 64 mm bar mesh. One floating and one sinking net combined, fished overnight, equal one unit of gill net effort.

2. Trap nets – 15 m lead, 1 m x 2 m sized frame, crowfoot throats on the first and third of five loops, 19 mm bar mesh, treated black. One trap net fished overnight equals one unit of trap net effort.

3. Electrofishing – A pulsed DC electrofishing boat with boom-mounted electrodes. One hour of current-on electrofishing equals one unit of electrofishing effort.

Blackfoot Reservoir

Blackfoot Reservoir is located on the Blackfoot River in Caribou County north of Soda Springs, ID. Its primary use is irrigation storage and flood control. The U.S. Bureau of Indian Affairs regulates the dam and reservoir. At full capacity, the reservoir is at 1,865 m elevation, covers 7,285 ha and contains 432,000,000 m^3 of water. Refilling begins in October and continues through spring. Irrigation use begins in June with drawdown beginning as irrigation demand exceeds inflow.

Historically, Blackfoot Reservoir was a premier fishery for large size (4+ kg) Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*. The fishery slowly deteriorated and eventually crashed in the early 1980s. In 1990, a comprehensive plan to reestablish a fishery for wild Yellowstone cutthroat trout was formulated after several years of study (LaBolle and Schill 1990). It called for elimination of wild cutthroat trout harvest from Blackfoot Reservoir. In order to provide a harvest fishery, large numbers of both hatchery rainbow trout *O. mykiss* and hatchery Bear Lake cutthroat trout *O. clarki utah* were stocked. Attempts were made for Bear Lake cutthroat trout to establish their own wild spawning run into the Little Blackfoot River. Bear Lake cutthroat trout stocking was discontinued in 1994. Rainbow trout stocking was increased as a replacement. In 1996 alone, 25% (by weight) of all fish stocked in the Southeast Region were allocated for Blackfoot Reservoir.

Chesterfield Reservoir

Chesterfield Reservoir is located on the Portneuf River in Caribou County. Its primary use is irrigation storage and flood control. The dam and reservoir are owned and operated by the Portneuf-Marsh Valley Canal Company. At full capacity, the reservoir is at 1,645 m elevation, covers 647 ha and contains 29,200,000 m^3 of water. Refilling begins in October and continues through early spring. Irrigation use generally begins in June with drawdown beginning as irrigation demand exceeds inflow.

Chesterfield Reservoir is managed as a put-and-grow trout fishery with excellent growth and significant numbers of carryover fish. Hatchery rainbow trout dominate the catch with occasional reports of wild cutthroat trout and hatchery brown trout *Salmo trutta* being taken. Most stocking is done with catchable and fingerling size rainbow trout. Plants of five to ten thousand fingerling brown trout were also frequent during the mid 1990s. In 1992, Department personnel chemically renovated Chesterfield Reservoir to rid it of undesirable species, specifically Utah chub *Gila atraria* and common carp *Cyprinus carpio*. Fish species currently found in Chesterfield Reservoir include: brown trout, cutthroat trout, rainbow trout, cutthroat-rainbow trout hybrids, Utah chub, and mountain sucker *Catostomas platyrhynchus*.

Condie Reservoir

Condie Reservoir is located in Franklin County, has a surface area of 47 ha, and elevation of 1,469 m. It stores irrigation water for the Twin Lakes Canal Company. Condie Reservoir's game fish include largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, yellow perch *Perca flavescens*, tiger muskie (northern pike *Esox lucius* x muskellunge *E. masquinongy*), and annually stocked rainbow trout. There is no perennial tributary for trout spawning.

Results from a 1987 Southeast Region questionnaire showed strong support for special bass regulations on one or two regional largemouth bass fisheries. LaBolle and Schill (1990) concluded from regional bass fishery investigations that "implementation of restrictive regulations on Condie Reservoir would dramatically increase numbers of age 4+ and older bass." Age 4+ bass in 1987 averaged 287 mm.

Based on LaBolle and Schill's (1990) recommendations, harvest regulations at Condie Reservoir in 1990 were changed from "general" to "trophy" for largemouth bass. Additionally, the same trophy regulation was established for trout at Condie Reservoir. The trophy regulation allowed a harvest of two trout and two bass with a minimum size of 20 inches. Slow growth of trout in Condie Reservoir resulted in removal of the trophy trout regulation in 1992. We believe that slow trout growth was at least partially caused by competition with a new and expanding yellow perch population resulting from an unauthorized introduction in the mid 1980s.

Twin Lakes

Twin Lakes is a 180 ha storage reservoir owned by the Twin Lakes Canal Company. Its name comes from its figure eight appearance with a narrow channel connecting two large round

bays. In the 1960s and 1970s Twin Lakes was known for its clear water and bluegill fishery. There were also abundant largemouth bass. However, prior to 1980 very few people in Idaho fished for bass (Reid 1989). In the late 1980s common carp were accidentally introduced into Twin Lakes via canals from Treasureton Reservoir. Water clarity decreased and the bluegill fishery declined. The trout fishery is perceived to be mediocre. In 1994, an attempt was made to remove common carp from the reservoir using a 2 ppm rotenone treatment. Twin Lakes Reservoir receives its water via canals from Mink Creek.

Bass Fishing Tournaments

Bass fishing tournaments were held on American Falls and Glendale reservoirs. In American Falls, smallmouth bass *Micropterus dolomieu* first appeared in anglers' catches in 1996. The first official bass tournament was held on American Falls Reservoir on June 19, 1999. We asked tournament anglers to record the length of all bass (kept or released). We measured and weighed each fish brought to the tournament weigh-in. During the Glendale Reservoir tournament held on July 25, 1999, fisheries personnel recorded lengths and weights from all bass brought to the tournament weigh-in.

RESULTS AND DISCUSSION

Lowland Lake Surveys

Blackfoot Reservoir

The lowland lake and reservoir survey was completed on July 13-14, 1999. Utah chub and Utah sucker *C. ardens* dominated the catch for all gear types. Relative species composition was 85% Utah chub followed by 13% Utah sucker, and 1% rainbow trout. Yellowstone cutthroat trout comprised <1% of the catch. The relative species composition was similar to past gillnetting results (Table 1; Thurow 1981).

Historically, Blackfoot Reservoir produced large rainbow and cutthroat trout (Thurow 1981). In 1999, 25% of rainbow trout sampled exceeded 400 mm. For rainbow trout larger than 300 mm, mean W_r was 103%. The size and mean W_r values indicate that food resources for rainbow trout in Blackfoot Reservoir are not limiting. Recent zooplankton data also suggest that forage quality for trout is excellent. In 1998, the zooplankton quality index (ZQI) for Blackfoot Reservoir was one of the highest recorded (1.33) out of 40 lakes and reservoirs surveyed in Idaho (Teuscher 1998).

Despite excellent growth, return-to-creel of hatchery rainbow trout is low. In a creel survey completed in 1997, anglers on Blackfoot Reservoir harvested less than 5% of planted trout by number and 21% by weight. Those data included fingerling and catchable size plants. Those values are well below department goals of 40% by number of 100% by weight. Future evaluations should focus on identifying factors limiting return to creel (i.e., survival).

Table 1. Gill net data from Blackfoot Reservoir from 1963 to 1999.

Date	Nets	Total catch	RBT [a]	Cut	Total trout	% trout	UC	US	Carp	YP	Total non-trout	% non-trout
May 1963	2					31						69
May 1964						25						75
May 1967	4	348			13	4					335	96
June 1968		270	15	4	19	8	122	129			251	92
July 1971	10	361	4	7	11	3	170	168	12		350	97
Aug 1971	10	421	5	9	14	3	286	115	6		407	97
June 1980	12	865	16	19	35	4	556	272	2		830	96
Oct 1980	11	820	55	91	146	18	530	142	2		674	82
July 1991		273	1	7	8	3	216	49			265	97
July 1997		389	6	6	12	3	351	22	4		377	97
July 1999	6	1,528	22	1	23	2	1,29	200	7	7	1,50	98

[a] RBT=rainbow trout, Cut=cutthroat trout, UC=Utah chub, US=Utah sucker, YP=yellow perch; carp=common carp.

Chesterfield Reservoir

A total of 286 fish were caught during the lowland lake and reservoir survey. Relative species composition was 66% rainbow trout, 28% Utah chub, 2% Utah sucker, 2% cutthroat trout, 1% dace *Rhinichthys spp*., and 1% rainbow x cutthroat hybrid trout. Since 1997, Utah chub increased in relative species composition by 75%. The increase in Utah chub was accompanied by a decline in W_r of small (<300 mm) rainbow trout. For rainbow trout less than 300 mm, W_r declined from 107% in 1997 to only 86% in 1999. The decline was statistically significant (ANOVA; $P < 0.01$). In addition to the reduction in condition of small rainbow trout, zooplankton abundance was relatively poor. In 1998, zooplankton quality index for Chesterfield was 0.18 (nearly an order of magnitude lower than Blackfoot Reservoir).

Surprisingly, mean W_r of rainbow trout >300 mm increased from 108% in 1997 to 112% in 1999 (Figure 1). The difference in condition for small and large rainbow may be related to changes in feeding behavior as trout become older and larger. Fingerling rainbow trout may be more dependent on zooplankton for food than larger rainbow trout. Given the trends in W_r, Utah chub abundance, and zooplankton densities, a reduction in the Utah chub population may be necessary to maintain a quality trout fishery in Chesterfield Reservoir.

A creel survey completed during the ice fishery failed to show any piscivory by rainbow trout on Utah chub. A total of 38 rainbow trout stomachs were examined. No fish were observed in rainbow trout stomachs. Trout examined ranged in size from 345 mm to 515 mm. Snails made up the largest proportion of diet items observed in rainbow trout stomachs (Table 2).

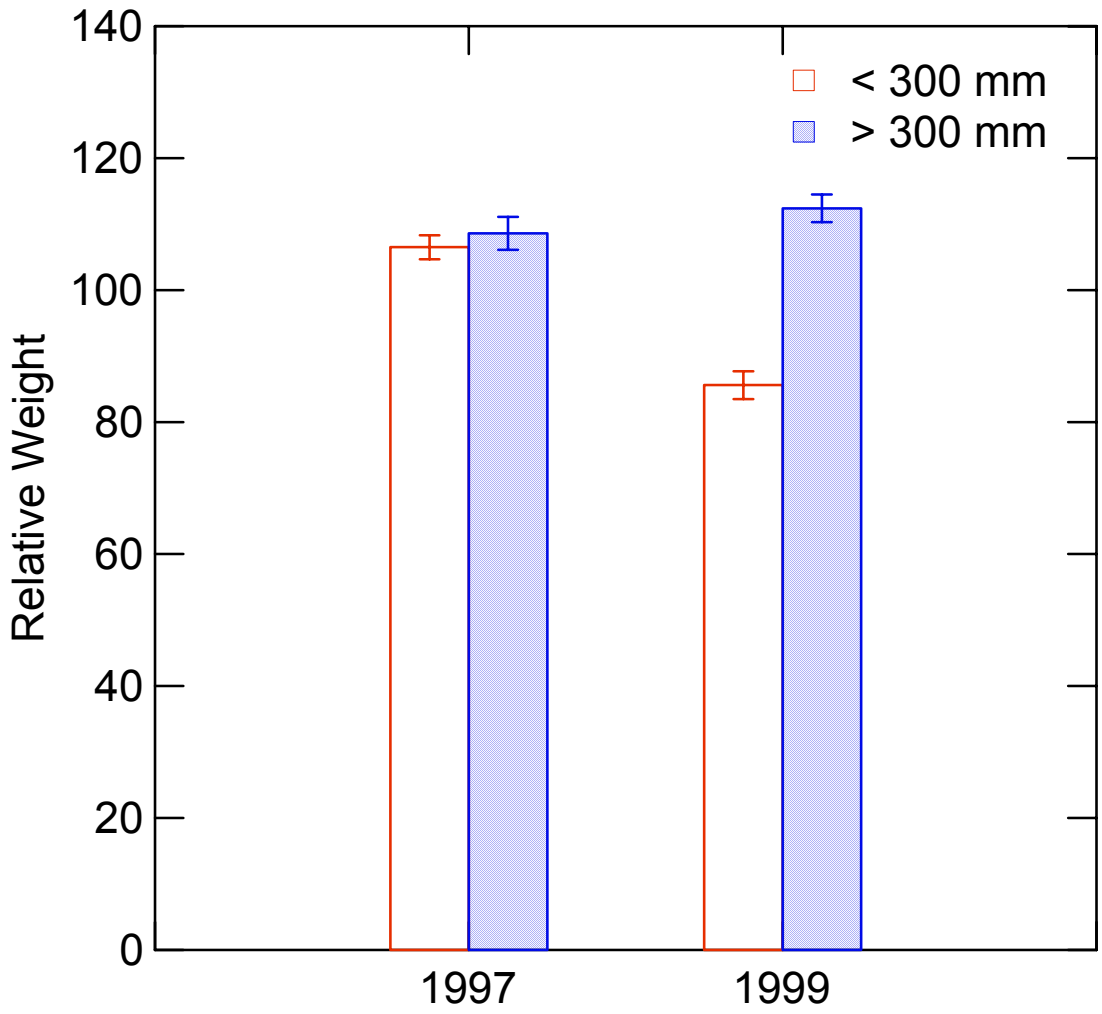

Figure 1. Mean W_r by size group for rainbow trout caught in Chesterfield Reservoir in 1997 and 1999. Means were similar for both size classes of rainbow trout in 1997, but significantly different between size groups in 1999 (Single Factor ANOVA; $P<0.01$).

Table 2. Qualitative diet analysis of trout collected from Chesterfield Reservoir in January 1999. The X symbol indicates presence but no counts were made. Values in parentheses are visual estimates of percent by mass.

Species	Length	Weight	Snails	Planktors	Midges	Algae	Other
	396	730	6	X	X	X (99%)	
	430	950	8 (99%)			X	
	410	720	1	X			
	390	750	2				
	495	1,300				X	
	420	1,000					
	460	1,200	24				
	422	800	3	X	X	X (95%)	
	425	850	22				
	334	430		X (99%)	X		
	409	690	10 (50%)	X (50%)			
	361	520	1	X (70%)	X (5%)	X (25%)	
	397	730		X (80%)	X	X (20%)	
	505	1,425	(20%)	X (20%)	X	X (60%)	
Rainbow trout	495	1,550	48 (100%)				
	489	1,400	31 (80%)			X (20%)	
	455	1,050	42 (80%)			X (20%)	
	487	1,180	4 (100%)				
	345	480				X (100%)	
	468	1,100	60 (100%)				
	373	600					
	492	1,600					
	426	900	26 (100%)				
	510	1,800					
	412	880	9 (70%)			X (30%)	
	465	1,090	1 (10%)			X (90%)	
	428	940	2 (50%)			X (50%)	
	515	1,660	102 (100%)				
	506	1,800	30 (100%)				
	405	820	41 (99%)	X			
Rainbow trout	421	830					
ad clip	421	810		X (30%)	X		Crayfish(70%)
	395	800	32 (100%)				
	490	1,350	32 (99%)				
Rainbow trout	508	1,300	49 (90%)			X (10%)	
x cutthroat	485	1,210	1 (50%)			X (50%)	
trout	503	1,200	22 (70%)			X (30%)	
Brown trout	510	1,600	130 (50%)				Scuds (50%)

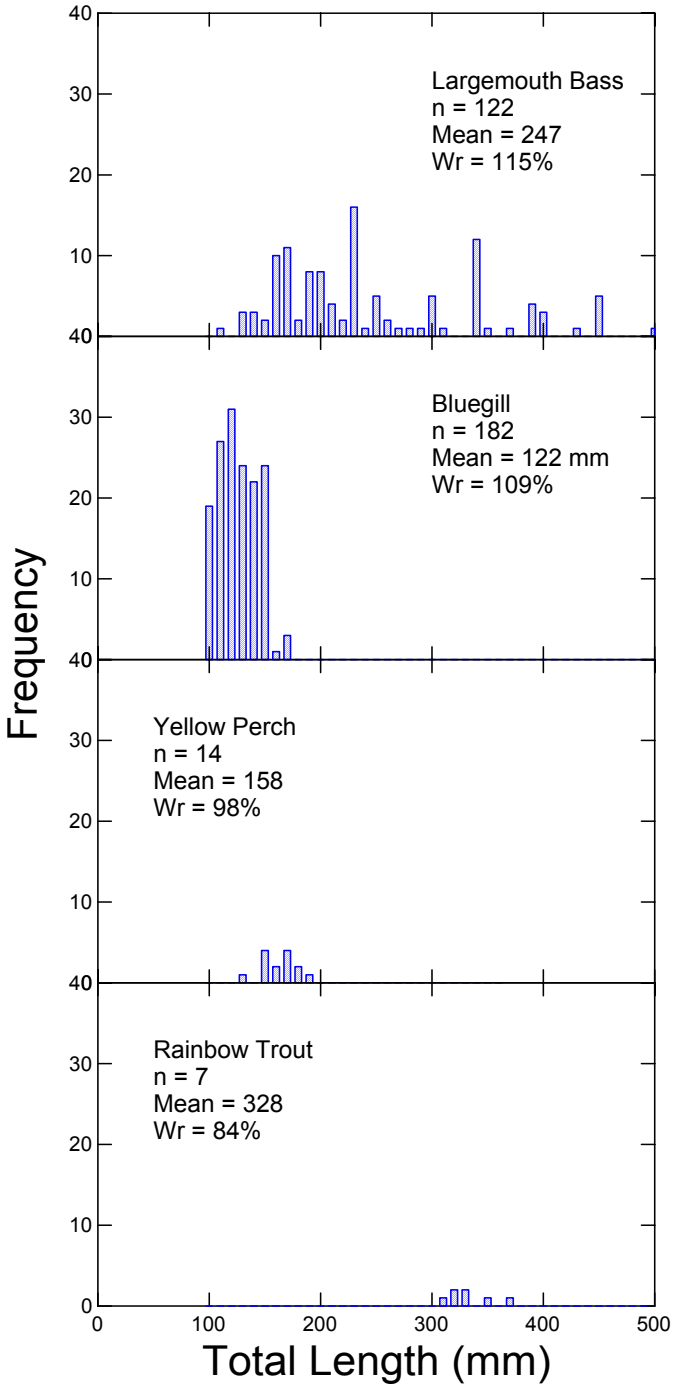

Figure 2. Length frequency, sample size, mean length, and mean relative weight (Wr) for largemouth bass, bluegill, yellow perch and rainbow trout caught in Condie Reservoir on June 9, 1999.

Condie Reservoir

A total of 325 fish were sampled during the survey completed on June 9, 1999. Relative species composition was 39% largemouth bass, 57% bluegill, 3% yellow perch, and 1% rainbow trout. Figure 2 shows length frequencies, mean lengths, and mean relative weights for all four species.

The 20-inch minimum size restriction in Condie Reservoir improved proportional stock density (PSD). In 1992, PSD for largemouth bass was 22%. That was the same year we implemented the 20-inch minimum size restriction. The PSD for largemouth bass collected in 1999 was 42%.

Twin Lakes

A general lowland lake and reservoir survey was completed on July 7, 1999. A total of 321 fish were sampled during the survey. Relative species composition was 66% largemouth bass, 27% bluegill, 4% yellow perch and 3% rainbow trout. Figure 3 shows length frequencies, mean lengths, and mean relative weights for all four species.

Twin Lakes appears to be overpopulated with largemouth bass. The PSD for the Twin Lakes largemouth bass population was 0% in 1996 and remained there in 1999. Currently, the majority of largemouth bass in Twin Lakes are less than 200 mm (Figure 3). The fishery for bluegill, yellow perch and largemouth bass may benefit from a 16-inch minimum size length restriction, similar to that of Glendale Reservoir. The PSD in Glendale Reservoir increased from 18% in 1993 to 83% in 1998. Shifting some of the largemouth bass to a larger size structure may also reduce competition with yellow perch and bluegill. However, high densities of stock-size largemouth bass (>200 mm) with low PSD often produce low densities of prey species such as bluegill and yellow perch that have high PSD. Thus these “largemouth bass crowded” communities produce good fishing for harvestable size panfish.

The community structure in Twin Lakes may shift somewhat toward larger largemouth bass in the next few years. This is because Twin Lakes Reservoir was chemically renovated in 1994 and restocked with largemouth bass and bluegill spawners in 1995. As a result, most of the largemouth bass and bluegill sampled in 1999 were less than age-4. Largemouth bass in the southeast Idaho reservoirs generally do not reach 300 mm until they reach age-5 and bluegill do not reach 150 mm until age-4.

Bass Fishing Tournaments

This was the first year that official bass fishing tournaments were held on American Falls Reservoir. Catch rates during the tournaments ranged from 0.31 to 1.82 bass per angler hour. Tournament effort ranged from 72 hr to 190 hr and 8 to 20 anglers. Smallmouth and largemouth bass were taken during the tournaments. Smallmouth bass dominated the catch of tournament anglers. The largest bass taken during the five tournaments was a largemouth bass at 4 kg. Table 3 shows angling statistics for each of the five tournaments.

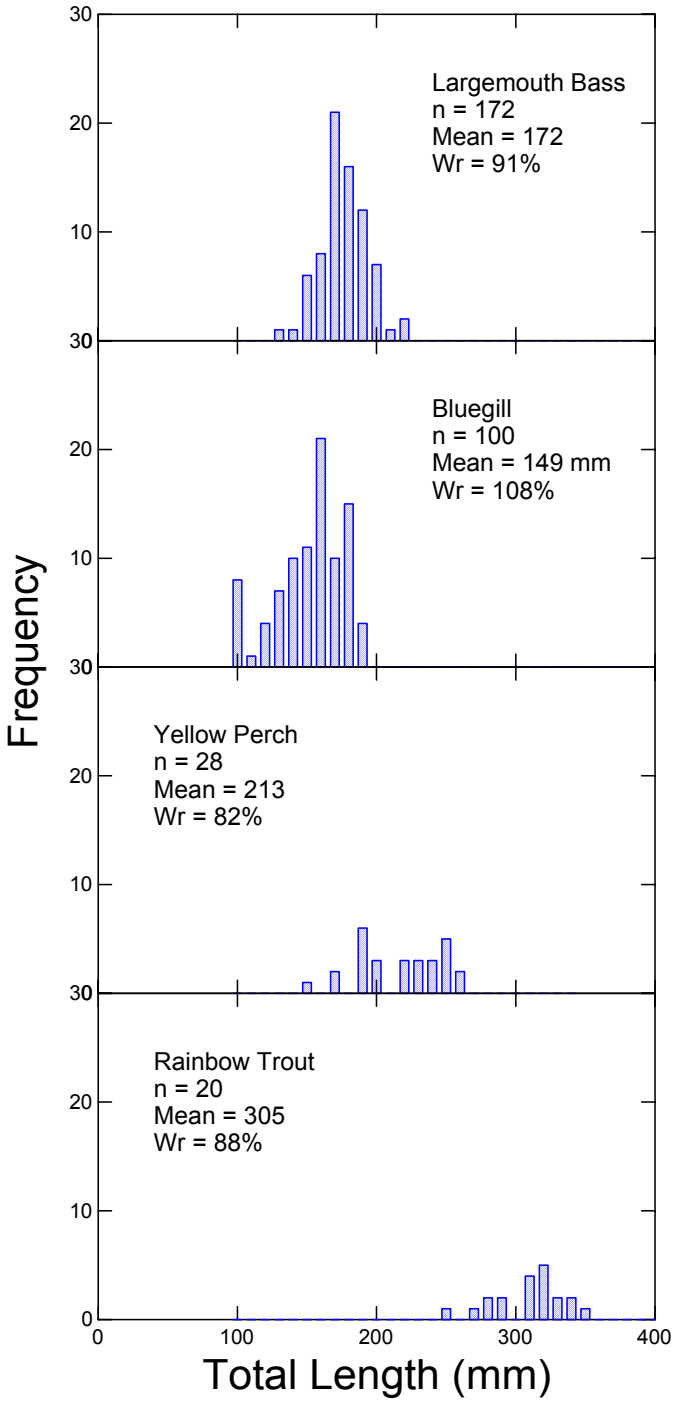

Figure 3. Length frequency, sample size, mean length, and mean relative weight (Wr) for largemouth bass, bluegill, yellow perch and rainbow trout caught in Twin Lakes on July 7, 1999.

Table 3. Catch data from bass fishing tournaments held on American Falls Reservoir in 1999.

					Catch by length group (%)		
Date	Anglers	Hr	Catch	Fish/hr	<305 mm	305–381 mm	>381 mm
6/19/01	17	153	122	0.80	20	71	8
6/20/01	17	153	144	0.94	26	72	2
7/18/01	20	190	182	0.96	32	59	9
8/28/01	8	68	124	1.82	54	46	1
9/19/01	14	112	102	0.91	60	36	4
9/26/01	8	72	22	0.31	43	53	4

Glendale Reservoir had general five bass, 12-inch minimum size rules until 1992 when rules changed to two bass, none under 16 inches. Prior to the rule change anglers caught few bass over the 12-inch minimum size. We have monitored Glendale Reservoir bass tournaments in most years since the rule change. Predominate size range in the catch increased to 325 mm in 1995 and has increased gradually ever since (Figure 4). During the six-year period between 1993 and 1999, the mode of length distributions increased by 80 mm (29%).

Since 1995, mean relative weights (W_r) ranged from 101% to 105%, which indicates a consistent high condition for bass in Glendale Reservoir. The largest bass measured in 1999 was 402 mm and 880 g. We have never recorded bass over 430 mm in Glendale Reservoir.

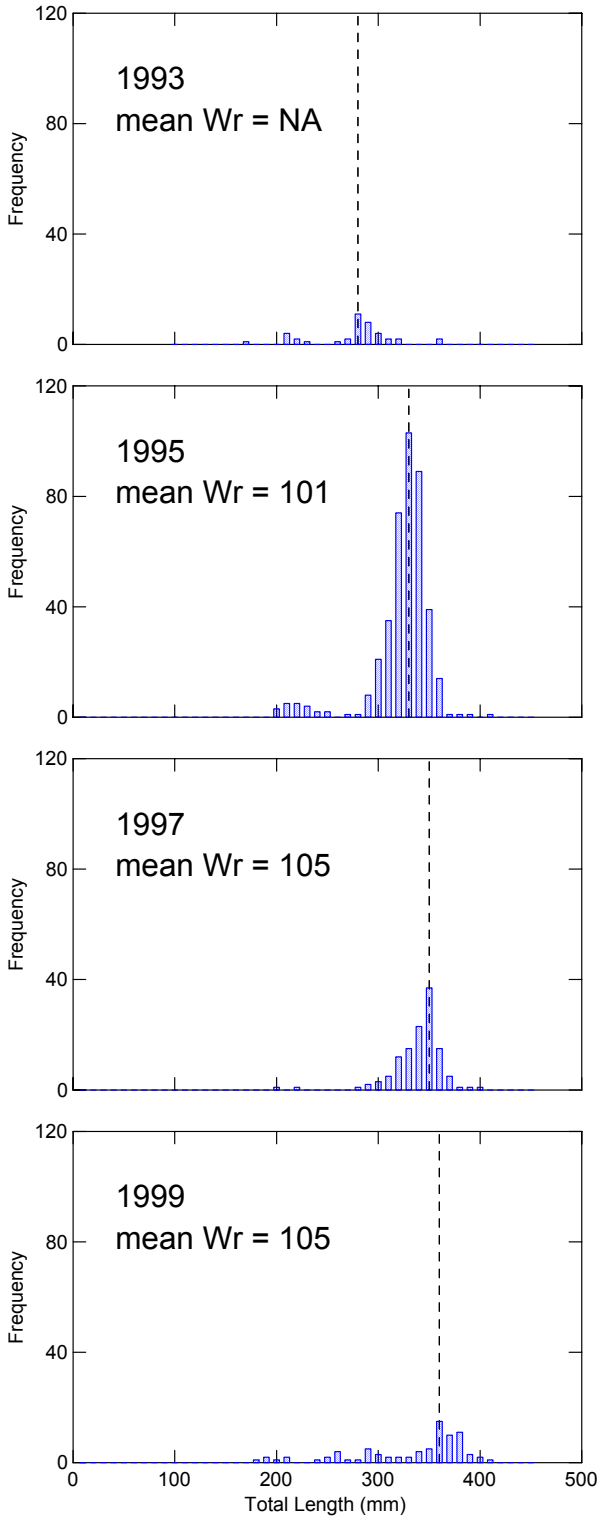

Figure 4. Bass length frequency histograms for Glendale Reservoir between 1993 and 1999. Mean relative weight (W_r) are shown. The vertical lines represent the mode of each distribution.

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ABSTRACT

We snorkeled fixed transects on St. Charles Creek to monitor trends in Bonneville cutthroat trout *Oncorhynchus clarki utah*, rainbow trout *O. mykiss,* and brook trout *Salvelinus fontinalis*. We also electrofished some of the same transects to evaluate snorkelers' ability to identify fish species, to correctly estimate fish length, and to compare fish population estimates between sample methods. Snorkel and electrofishing estimates of total fish abundance were similar, but species and size of fish differed. In general, snorkeling crews overestimated fish size and misidentified brook and rainbow trout as Bonneville cutthroat trout.

In 1999, we completed a hook and line survey of Yellowstone cutthroat trout *O. c. bouvieri* in McCoy Creek. The evaluation was completed to determine if the late opener (July 1) was protecting mostly wild or hatchery spawning cutthroat trout. The hook and line survey was completed prior to opening day and only fish over 254 mm were included in the comparison. The majority (79%) of cutthroat trout caught during the survey were of natural origin. The remaining 21% were hatchery cutthroat trout stocked to enhance the Palisades Reservoir fishery.

Fisheries personnel completed backpack electrofishing surveys on Cold, Dempsey, Fish, Pocatello, Rock, Little Blackfoot, Angus, Brush, Home Canyon, and North creeks. The surveys were completed to determine the status of Yellowstone (Snake River drainage) or Bonneville (Bear River drainage) cutthroat trout. We used mark-recapture or multiple pass depletion electrofishing methods to estimate the number of trout in sampled sections. Bonneville cutthroat trout densities ranged from 0.73 fish/100 m^2 in upper North Creek to 5.1 fish/100 m^2 in Home Creek. For Yellowstone cutthroat trout, densities ranged from 0.0 fish/100 m^2 in several streams to 13.2 fish/100 m^2 in Dempsey Creek.

We conducted an opening day creel survey on the Snake River below American Falls Dam. This is a high quality hatchery trout fishery with special rules to limit harvest of trout over 406 mm long. Of 854 harvested trout examined, 98% were rainbow trout. Of these, 18% were trout that had been stocked into this river reach, as evidenced by adipose-fin clips. Most of the marked trout had been in the river at least one year. Anglers caught an average of 3.8 trout and kept an average of 1.9 trout per person. Of the harvested trout that were at least 305 mm long, 58% were also at least 406 mm long.

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INTRODUCTION AND METHODS

McCoy Creek

McCoy Creek is located in Bonneville County and flows approximately 25 km before entering Palisades Reservoir. McCoy Creek is one of the few tributaries in southeast Idaho that supports a wild population of Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*. In addition to the naturally produced cutthroat trout, hatchery cutthroat trout are stocked in Palisades Reservoir. This investigation was initiated to determine what proportion of spawning Yellowstone cutthroat trout are of hatchery origin.

All hatchery cutthroat released in Palisades Reservoir were marked with a pelvic clip. Angling was completed on June 24, 1999, a week prior to the July 1 opener. Fisheries staff and volunteers caught fish using artificial flies. Captured fish were examined for fin clips and measured for total length. Only fish greater than 254 mm were considered in the comparison. To reduce recapture bias, captured fish were released below the area being fished and all anglers moved together upstream.

St. Charles Creek

St. Charles Creek is a second order tributary to Bear Lake originating in the Bear Lake Range and flowing eastward into Bear Lake. The lower portion (approximately 13 km) flows through private property where it splits into Big and Little St. Charles creeks. Much of St. Charles Creek is diverted for agricultural purposes. The stream is the only tributary to Bear Lake that has a history of maintaining a viable population of naturally reproducing Bonneville cutthroat trout. The Department has in recent years completed several projects on Little St. Charles Creek to improve habitat for the Bonneville cutthroat trout *O. c. utah*. Completed projects include cattle-exclosure fencing and screening of several irrigation diversions. Evaluating the potential benefits of habitat projects and general monitoring of juvenile trout abundance are completed using snorkel surveys.

On August 26-27, 1999, we conducted snorkel surveys on nine sections of St. Charles Creek. The survey sites were located as close as possible to those used by Schill and Heimer (1988). Figure 1 shows the survey sites on St. Charles Creek. One of the snorkel sites was resampled using backpack electrofishing. The electrofishing survey was a multiple pass depletion estimate and was completed approximately one hour after the snorkel survey. The purpose of the electrofishing survey was to validate snorkel estimates of fish abundance, species identification, and size distributions.

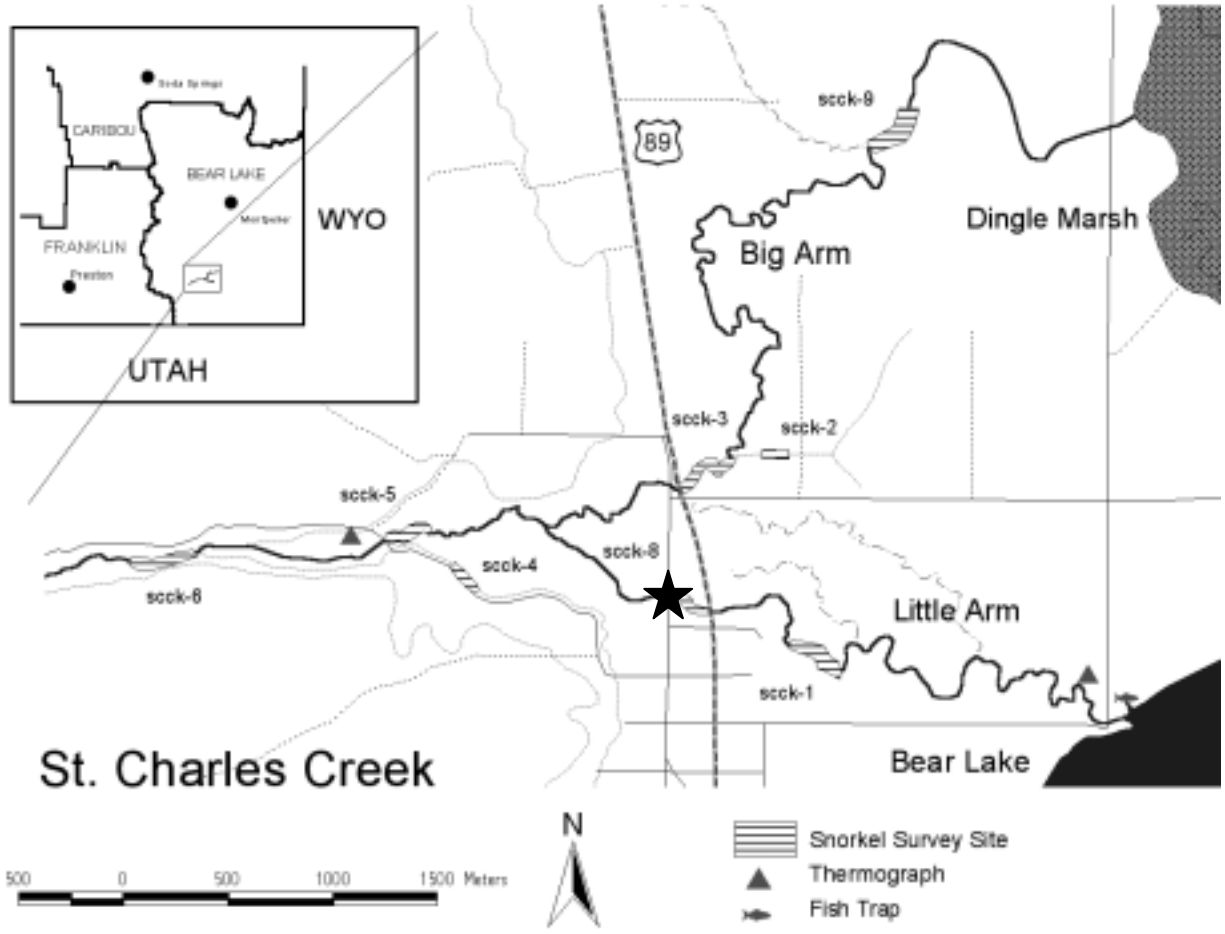

Figure 1. Map of St. Charles Creek, Idaho, indicating snorkel and electrofishing sites. Site scck-8 was used for the comparison between snorkel and electrofishing methods and is indicated by the ★.

RESULTS AND DISCUSSION

McCoy Creek

Anglers caught 81 fish over 254 mm, 17 (21%) of which were hatchery Yellowstone cutthroat trout. That proportion indicates that most of the spawners in McCoy Creek are naturally produced. The delayed opening of July 1 is therefore protecting mostly wild cutthroat trout. Figure 2 shows all of the fish caught during the angling effort.

St. Charles Creek

For all snorkel sections combined, the relative species composition was 57% (653) Bear Lake cutthroat trout, 41% (467) brook trout *Salvelinus fontinalis* and 2% (18) rainbow trout *Oncorhynchus mykiss*. Those values were similar to results from 1995, when the relative species composition was 56% cutthroat trout, 41% brook trout, and 3% rainbow trout. The majority (74%) of the cutthroat trout observed by snorkeling were less than 127 mm in length. Only 4% of cutthroat trout were estimated to be over 254 mm. The paucity of larger cutthroat trout is similar to findings from past snorkel surveys (Schill and Heimer 1988; Scully and Mende 2000) and suggests that most Bear Lake cutthroat trout migrate from St. Charles Creek to Bear Lake as age-1+ juveniles.

Total abundance results from snorkel and electrofishing surveys varied. In section 8, the snorkel estimate of total fish abundance was 94 cutthroat trout, 49 brook trout, and 8 rainbow trout. Electrofishing estimate of total abundance was 22 cutthroat trout, 72 brook trout, 10 rainbow trout, and 5 rainbow x cutthroat trout hybrids. For all fish combined, the snorkel estimate was 31% higher than the electrofishing survey. The variation between sampling methods, however, was much greater when evaluated by species. The snorkel survey overestimated the abundance of cutthroat trout by 327% and underestimated the abundance of brook trout by 47%.

Snorkel estimates of fish size also varied. For example, in a replicated section of stream, snorkel crews estimated that 50% of brook trout were over 254 mm long. Fish sampled with electrofishing equipment indicated that the actual proportion of brook trout over 254 mm was 13%. Figure 3 shows length frequency distributions for snorkel and electrofishing surveys.

Due to the marked differences in survey results, we recommend that future evaluations in St. Charles Creek be completed with electrofishing gear.

Fisheries personnel completed backpack electrofishing surveys on Cold, Dempsey, Fish, Pocatello, Rock, Little Blackfoot, Angus, Brush, Home Canyon, and North creeks. The surveys were completed to determine the status of Yellowstone (Snake River drainage) or Bonneville (Bear River drainage) cutthroat trout. We used mark-recapture or multiple pass depletion electrofishing methods to estimate the number of trout in sampled sections. Bonneville cutthroat trout densities ranged from 0.73 fish/100 m^2 in upper North Creek to 5.1 fish/100 m^2 in Home Creek. For Yellowstone cutthroat trout, densities ranged from 0.0 fish/100 m^2 in several streams to 13.2 fish/100 m^2 in Dempsey Creek. A summary of stream electrofishing results is shown in Appendix A.

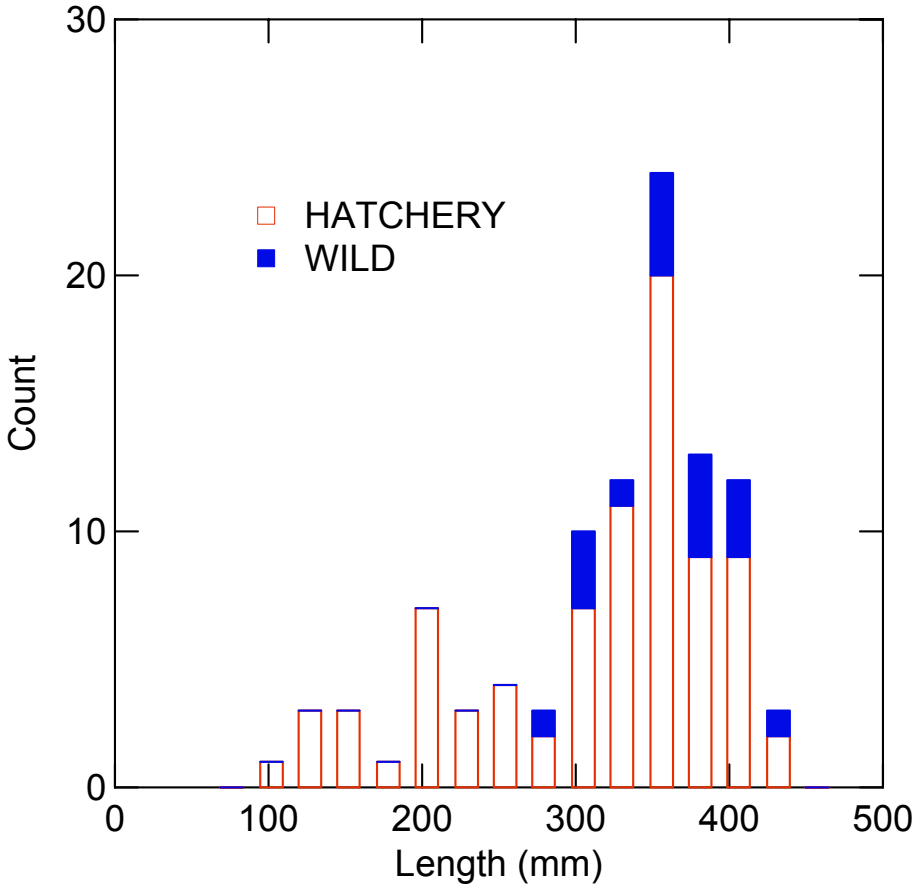

Figure 2. Length frequency distribution of Yellowstone cutthroat trout caught in McCoy Creek on artificial flies. The fish were captured on June 24, 1999, one week before the July 1 opener. Hatchery fish were distinguished from naturally produced fish by a pelvic fin clips. The hatchery cutthroat trout were marked prior to release in Palisades Reservoir.

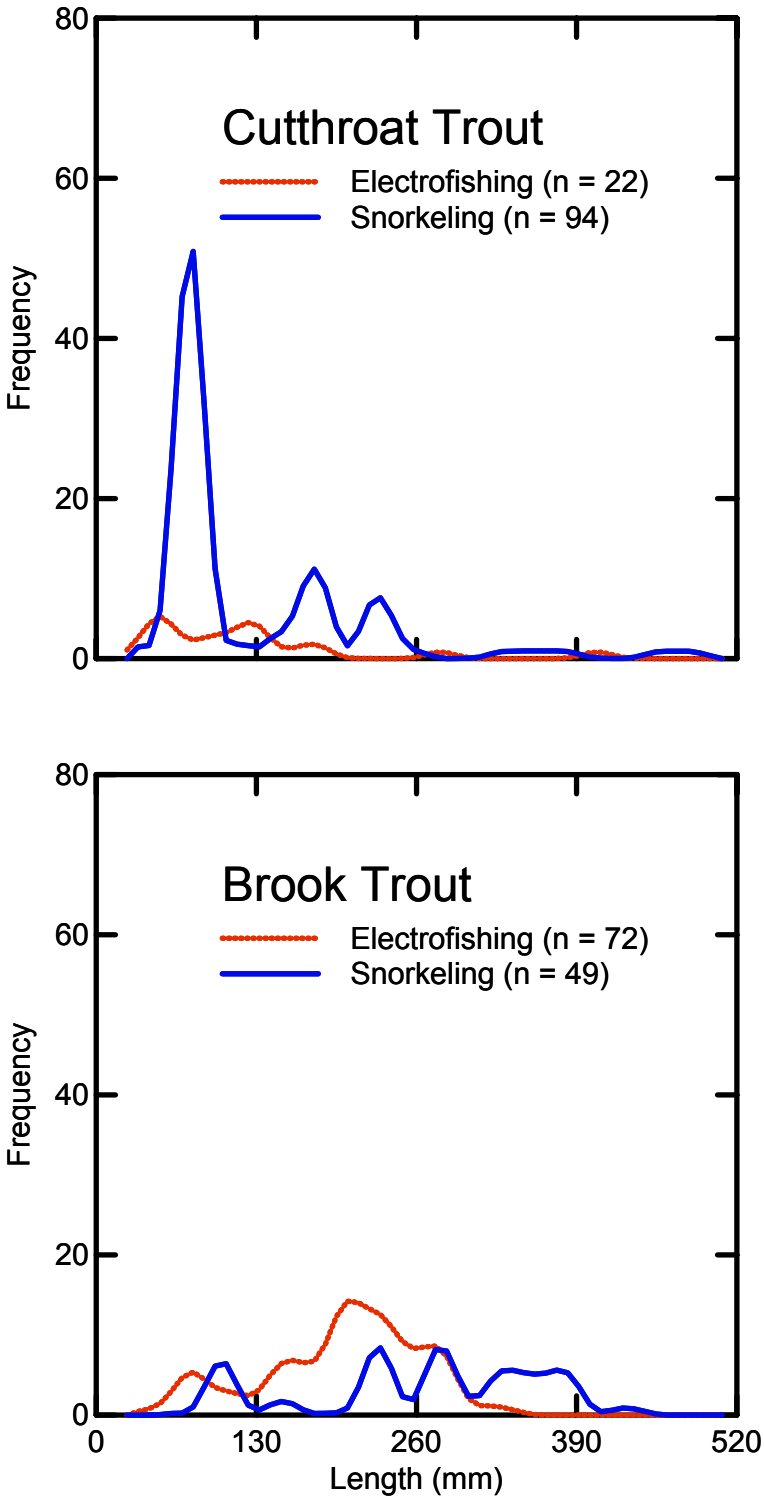

Figure 3. Comparison of snorkel and electrofishing survey results collected in St. Charles Creek, Idaho.

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APPENDIX

Appendix A. Electrofishing data collected to determine the status of Yellowstone or Bonneville cutthroat trout.

Stream	Drainage	Site length (m)	Fish densities (number/100 m^2)					
			Trout	Cutt[a]	RBT	BRK	BRN	Hyb
Fish, L.[b]	Portneuf River	89	12.55	8.56	2.28	0.00	0.57	1.14
Fish, U.	Portneuf River	87	9.93	9.93	0.00	0.00	0.00	0.00
Dempsey L1	Portneuf River	113	6.73	4.75	0.00	0.59	1.39	0.00
Dempsey U1	Portneuf River	142	6.76	6.38	0.00	0.00	0.38	0.00
Dempsey U2	Portneuf River	65	14.07	13.19	0.00	0.44	0.44	0.00
Dempsey L2	Portneuf River	78	9.89	9.55	0.00	0.34	0.00	0.00
Cold, U.	Snake River	37	26.11	0.00	26.11	0.00	0.00	0.00
Cold, L.	Snake River	118	10.70	0.00	10.70	0.00	0.00	0.00
Rock, L.	Snake River	103	0.00	0.00	0.00	0.00	0.00	0.00
Rock, EL	Snake River	189	6.24	1.04	3.27	0.00	0.00	1.93
Rock, EU	Snake River	87	29.05	0.00	27.65	0.00	0.00	1.40
Pocatello 1	Portneuf River	0	0.00	0.00	0.00	0.00	0.00	0.00
Pocatello 2	Portneuf River	0	0.00	0.00	0.00	0.00	0.00	0.00
Home	Bear River	109	9.27	2.78[c]	0.46	0.00	5.10	0.93
North L	Bear River	93	11.38	5.10[c]	0.00	5.89	0.00	0.39
North U	Bear River	98	1.10	0.73[c]	0.00	0.37	0.00	0.00
St. Charles la-1	Bear River	115	15.22	2.05[c]	1.71	10.43	0.00	0.86

[a] Cutt = Cutthroat trout, RBT = rainbow trout, BRK = brook trout, BRN = brown trout, Hyb = cutthroat x rainbow trout

[b] Upper (U) and Lower (L) sections were sampled in most streams.

[c] Indicates Bonneville cutthroat trout. All other cutthroat trout are Yellowstone cutthroat trout.

1999 ANNUAL PERFORMANCE REPORT

State: Idaho Program: F-71-R-24

Project II: Technical Guidance Subproject I-F: Southeast Region

Contract Period: July 1, 1999 to June 30, 2000

ABSTRACT

We provided input to the Regional Environmental Staff Biologist on activities affecting fish and anglers. We coordinated with personnel of various agencies on hydropower, mining, road building, stream alteration, grazing allotments, National Pollution Discharge Elimination Systems permits, fill/excavation, and other projects. The Southeast Region fisheries personnel worked with anglers to improve rapport and open communication with agencies and the public.

Author:

Richard Scully
Regional Fishery Manager

1999 ANNUAL PERFORMANCE REPORT

State: Idaho Program: F-71-R-24

Project III: Habitat Management Subproject I-F: Southeast Region

Contract Period: July 1, 1999 to June 30, 2000

ABSTRACT

Idaho Department of Fish and Game employees and Southeast Idaho Fly Fisher volunteers maintained two miles of riparian corridor fence along reaches of the upper Portneuf River. We also conducted regular repair to this fence and removed trespass livestock as needed.

Idaho Department of Fish and Game employees and Southeast Idaho Fly Fisher volunteers installed 100 m of juniper revetments along a section of the upper Blackfoot River on the department's Blackfoot River Wildlife Management Area (WMA).

Fisheries personnel and volunteers from other agencies and the Shoshone-Bannock tribes conducted habitat surveys on the headwater tributaries of the upper Blackfoot River in late September and early October. The stream habitat within the Bear Lake Grazing Company property is poor rearing and spawning habitat. Installing riparian corridor fences is a suggested first step that could be taken to reduce sedimentation and improve bank stability and cover.

On September 11, 1999 we rotenoned Devil Creek Reservoir to remove Utah chub *Gila atraria*, common carp *Cyprinus carpio* and goldfish *Carassius auratus*. We treated 50.1 hectare meters of water in the reservoir and 4.9 hectare meters of inflow from Wednesday night to Saturday morning. The treatment concentration was 3 ppm. We sprayed the shoreline, used boat-bailers and mixed rotenone in the prop wash in transects and used a pump and perforated hose to apply rotenone into the deeper parts of the water column. There was no water deeper than 6.1 m.

Author:

Richard Scully
Regional Fishery Manager

OBJECTIVE

Work with landowners to improve/restore habitat on degraded streams on private property with good potential to enhance wild trout recruitment.

INTRODUCTION AND DISCUSSION

Idaho Department of Fish and Game employees and Southeast Idaho Fly Fisher volunteers maintained two miles of riparian corridor fence along reaches of the upper Portneuf River. We also conducted regular repair to this fence and removed trespass livestock as needed.

Idaho Department of Fish and Game employees and Southeast Idaho Fly Fisher volunteers installed 100 m of juniper revetments along a section of the upper Blackfoot River on the department's Blackfoot River Wildlife Management Area (WMA).

Fisheries personnel and volunteers from other agencies and the Shoshone-Bannock tribes conducted habitat surveys on the headwater tributaries of the upper Blackfoot River in late September and early October. Figure 1 shows the survey sites on the Bear Lake Grazing Company property (BLGC). These surveys were permitted in exchange for allowing BLGC to graze livestock on the Department's Blackfoot River WMA. The purpose of the surveys was to document status of potential spawning and rearing habitat for Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*. The information was used to inform the landowners of problems and to make recommendations to improve water quality and riparian habitat. For each tributary stream, at least 700 m of stream was surveyed at 100 m intervals. Data collected every 100 m included percent fines, bank stability, percent cover, and mean depth. All of the data except mean depths were visual estimates. Figure 2 shows mean percent fines. The overall mean percent fines value for the BLGC property was 55%. That value is very high and not conducive to successful cutthroat trout spawning. Bjornn and Reiser (1991) estimated cutthroat trout embryo survival across a range of percent fines values. Their relationship suggests that cutthroat trout embryo survival on the BLGC property would be less than 10% (Figure 2). Table 1 shows substrate values, bank stability, percent cover, and mean depths. In summary, the stream habitat within the BLGC property is poor rearing and spawning habitat. Installing riparian corridor fences is a suggested first step that could be taken to reduce sedimentation and improve bank stability and cover.

On September 11, 1999, we rotenoned Devil Creek Reservoir to remove Utah chub, common carp and gold fish. We treated 406 ac-ft of water in the reservoir and 40 ac-ft of inflow from Wednesday night to Saturday morning. The treatment concentration was 3 ppm, which is one gallon/ac-ft of water. We sprayed the shoreline, used boat-bailers and mixed rotenone in the prop wash in transects and used a pump and perforated hose to apply rotenone into the deeper parts of the water column. There was no water deeper than 20 feet.

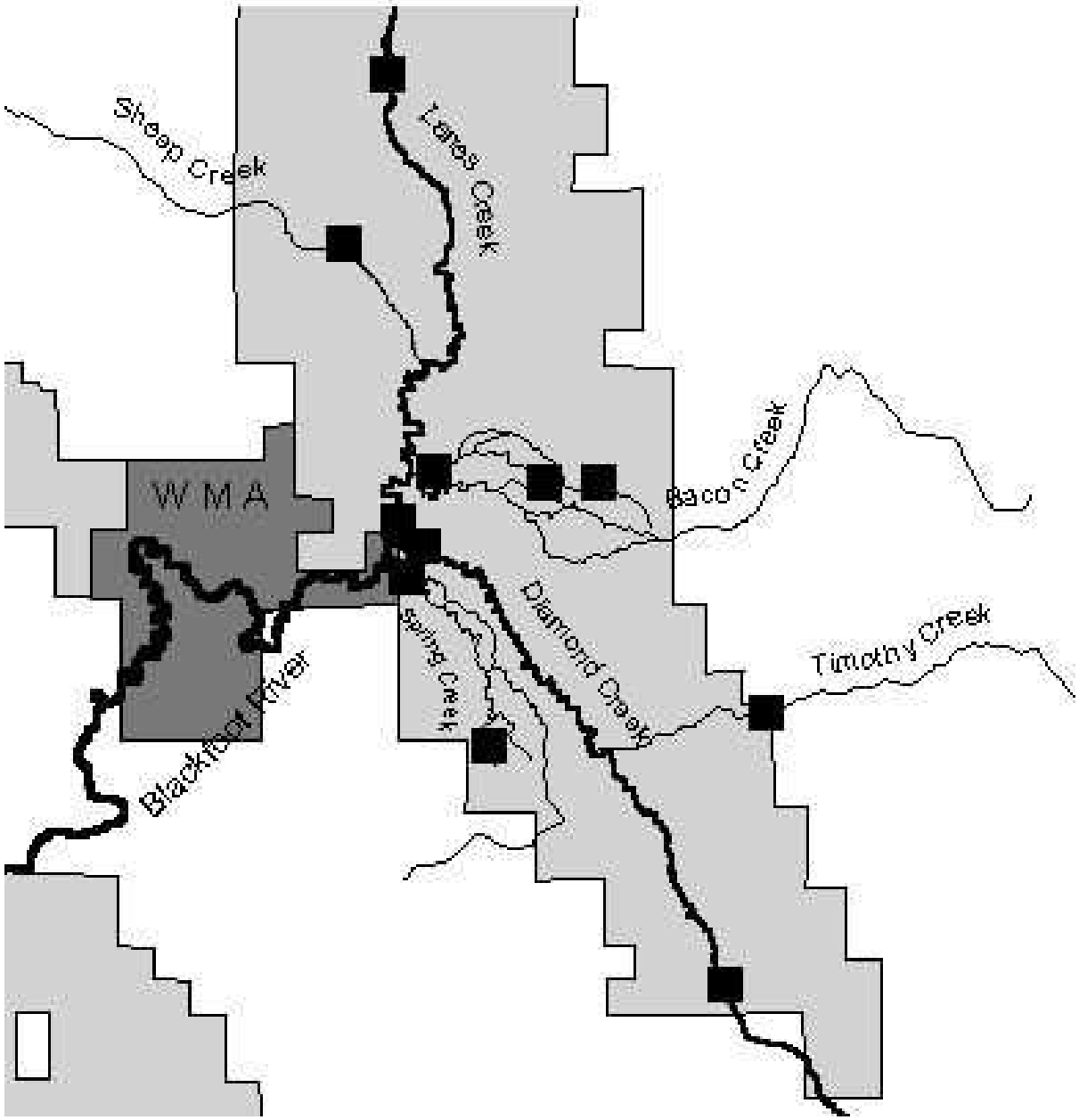

Figure 1. Habitat survey sites (■) within property boundaries of the Bear Lake Grazing Company. Shaded area of the map indicates private property. Nonshaded regions are public property.

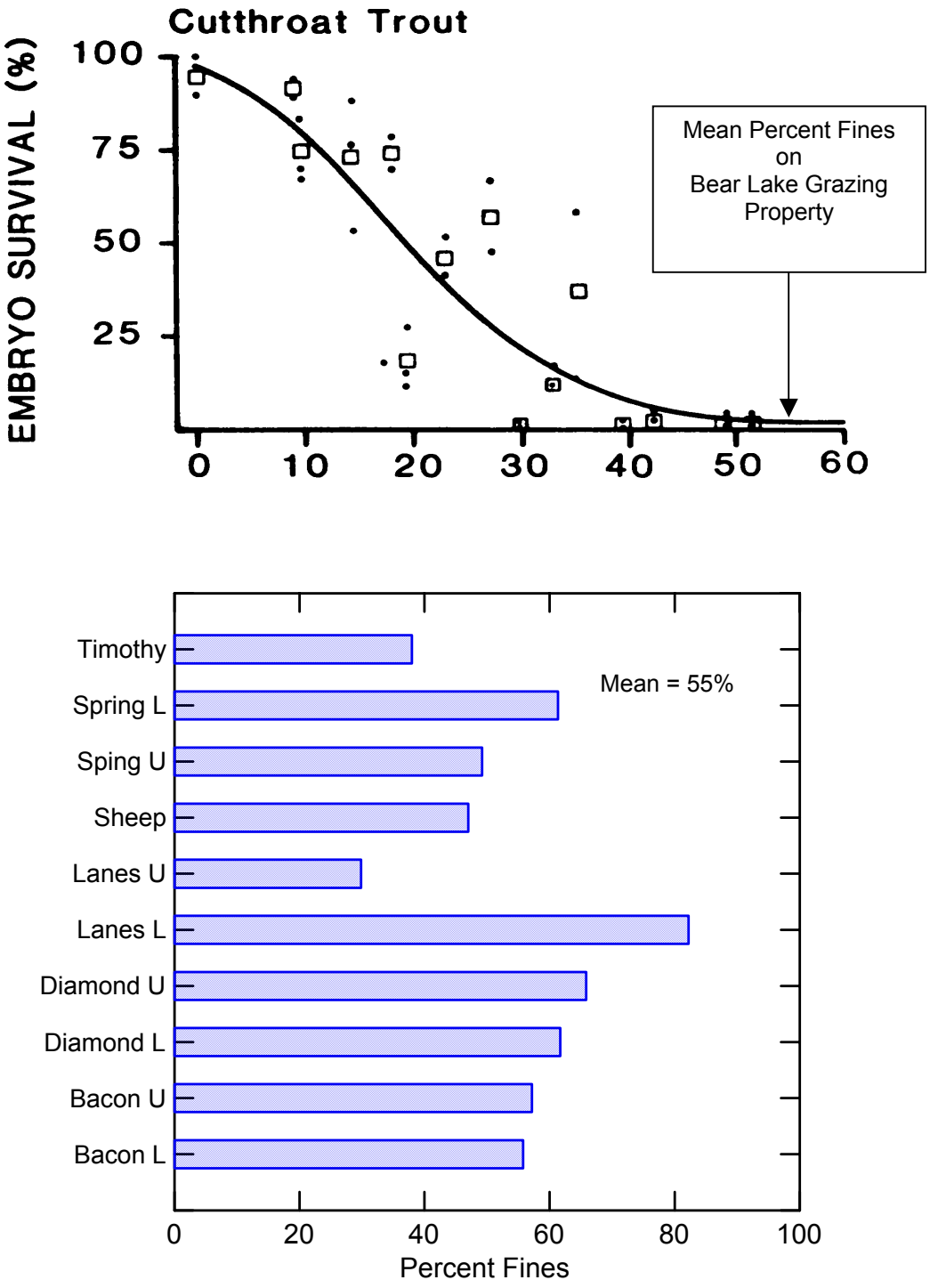

Figure 2. Percent fines on BLGC property (bottom) and embryo survival for cutthroat trout plotted as a function of percent fines (top). The embryo survival relationship for cutthroat trout was redrawn from Bjornn and Reiser (1991). Percent fines values were visual estimates at the surface. Many of the streams were sampled in an upper (U) and lower (L) section.

Table 1. Habitat characteristics for tributary streams within the BLGC property. Depth, width, substrate, and bank characteristics are mean values.

	Stream morphology (m)			Substrate characteristics (%)					Bank values (%)	
Tributary	Survey length	Depth	Width	Sand	Gravel	Rubble	Boulder	Bedrock	Cover	Stability
Bacon L.	2,200	0.23	1.40	56	29	13	0	1	78	61
Bacon U.	700	0.19	1.10	56	29	13	0	1	78	61
Diamond L.	1,300	0.25	3.40	62	37	2	0	0	50	37
Diamond U.	2,000	0.25	2.10	66	26	8	0	0	65	55
Lanes L.	2,800	0.42	3.50	82	17	0	0	0	58	46
Lanes U.	1,000	0.31	3.30	30	34	27	9	0	71	58
Sheep	800	0.20	1.20	47	40	13	0	0	66	52
Spring L.	1,000	0.31	2.50	61	39	0	0	0	71	65
Spring U.	1,600	0.21	3.60	49	44	6	0	0	89	93
Timothy	1,700	0.24	2.00	38	35	20	7	0	52	51

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